TECHNOLOGY TRANSFER PROGRAM (TTP)

FINAL REPORT

INDUSTRIAL RELATIONS

INDUSTRIAL RELATIONS
EXECUTIVE SUMMARY

Prepared By:

Levingston Shipbuilding Company
Orange, Texas

March 28, 1980

Report Documentation Page

Form Approved
OMB No. 0704-0188

1. REPORT DATE	2. REPORT TYPE	3. DATES COVERED
28 MAR 1980	**N/A**	**-**

4. TITLE AND SUBTITLE	5a. CONTRACT NUMBER
Technology Transfer Program (TTP) Industrial Relations Executive Summary	5b. GRANT NUMBER
	5c. PROGRAM ELEMENT NUMBER
6. AUTHOR(S)	5d. PROJECT NUMBER
	5e. TASK NUMBER
	5f. WORK UNIT NUMBER
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) **Naval Surface Warfare Center CD Code 2230 - Design Integration Tools Building 192 Room 128-9500 MacArthur Blvd Bethesda, MD 20817-5700**	8. PERFORMING ORGANIZATION REPORT NUMBER
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)	10. SPONSOR/MONITOR'S ACRONYM(S)
	11. SPONSOR/MONITOR'S REPORT NUMBER(S)

12. DISTRIBUTION/AVAILABILITY STATEMENT
Approved for public release, distribution unlimited

13. SUPPLEMENTARY NOTES

14. ABSTRACT

15. SUBJECT TERMS

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT	b. ABSTRACT	c. THIS PAGE			
unclassified	**unclassified**	**unclassified**	**SAR**	**33**	

PREFACE

This document is a summary of a report on Industrial Relations resulting from the Shipbuilding Technology Transfer Program performed by Livingston Shipbuilding Company under a cost-sharing contract with the U.S. Maritime Administration.

This summary provides a condensation of the findings and conclusions of Livingston's study of the Industrial Relations practices currently in use in the shipyards of Ishikawajima-Harima Heavy Industries Co., Ltd., (IHI), of Japan. Livingston gratefully acknowledges the generous assistance of the IHI consulting personnel and of all the IHI personnel in Japan who made this study possible.

For details concerning the Technology Transfer Program or of the information contained herein, please refer to the full Final Report on this subject.

EXECUTIVE SUMMARY

GENERAL

In Livingston's study of the Industrial Relations functions currently in use in IHI it became clear that, although not identified as such, these functions-comprise an Integrated "Personnel System" which is a vital part of the production system of the IHI shipyards.

This "Personnel System" consists of many facets, each contributing to the overall personnel-orientation of IHI and the Japanese shipbuilding industry. The Final Report of which this report is a summary examines each of these facets in detail and attempts to place all of the aspects of this "personnel system" into a logical context.

The elements of the "Personnel System" are as follows:

Basic Organization Structure

Operating Practices

Pay Rates

Benefits

Personnel Welfare Systems

Management/Labor Relations

Training

BASIC ORGANIZATION STRUCTURE

Ishikawajima-Harima Heavy Industries CO., Ltd., (IHI), is a large multi-company corporation involved in the manufacture of heavy industrial equipment, processing plants, and ships. The corporation maintains operations throughout the world although its headquarters and the majority of its manufacturing capability resides in Japan.

IHI operates six shipyards in addition to its numerous other companies. The shipyards of IHI are: Tokyo Shipbuilding and Crane Works; Yokohama No. 1 Works; Nagoya Works; Chits Works; Aioi Shipbuilding and Boiler Works; and Kure Shipbuilding and Fabricated Structure Works. The IHI shipyards are all organized and operated identically except for minor variations necessitated by geographical peculiarities and facility constraints.

Within IHI, the corporate office (Head Office) is responsible for all ship sales and for the establishment of the “Basic Design”. Delivery schedules are also established by the Head Office after consultation with the yard selected for the construction program. Essentially, the Head Office controls the distribution of work to all of its six yards and is responsible for all marketing activities for these yards.

Many of the corporate groups contribute to the internal and external support of the shipyards and almost all of these groups maintain a direct interface with shipyard counterparts in their respective areas of responsibility.

Because of the similarities of the organization and operating practices of the IHI yards, it is possible to use the Aioi yard as a typical example for this discussion.

Aioi Organization

The IHI Aioi District is organized into two major divisions: No. 1 Works - Boiler Works and Shipbuilding; No. 2 Works - Foundry Works and Diesel Works.

IHI is licensed to build both Sulzer and Pielstick diesel engines and the No. 2 Works at Aioi is primarily concerned with these products. The Boiler Works which builds boilers for steam power plants both for land installations and for main engines for ships, is managed as part of the #l Works which is primarily devoted to ship construction and repair. The organizational structure of shipbuilding at Aioi is shown in Figure A. Supplementing the IHI organization are approximately 35 subcontractors located immediately adjacent to the yard.

The Aioi District was recently reorganized (in 1978) to better reflect the several product areas and to clearly separate the functions and personnel of each area. The division into No. 1 and No. 2 works illustrates this product alignment. This division is specifically oriented around production functions with Sales and Engineering support provided by the IHI Head Office in Tokyo.

Also in this division of product lines was the distinction of primary “welding” activities as opposed to “machining” operations. The No. 1 Works (i.e. Shipbuilding and Boiler Works) is considered primarily as a welding operation, while the No. 2 Works (i.e. Foundry and Diesel Works) is considered a machining operation. This alignment of product line operations provides for a high degree of concentration of personnel, equipment, and facility resources in each product area.

Of the total IHI employment of 27,340 personnel in July 1979, the six IHI shipyards accounted for 11,272 or 41 percent of this total. Within Aioi Shipyard 3243 employees are dedicated to shipbuilding and ship repair activities, 2749 of them exclusively to new construction.

In the Aioi yard the average age of employees was 37 (in July 1979) and the average length of service with the shipyard was between

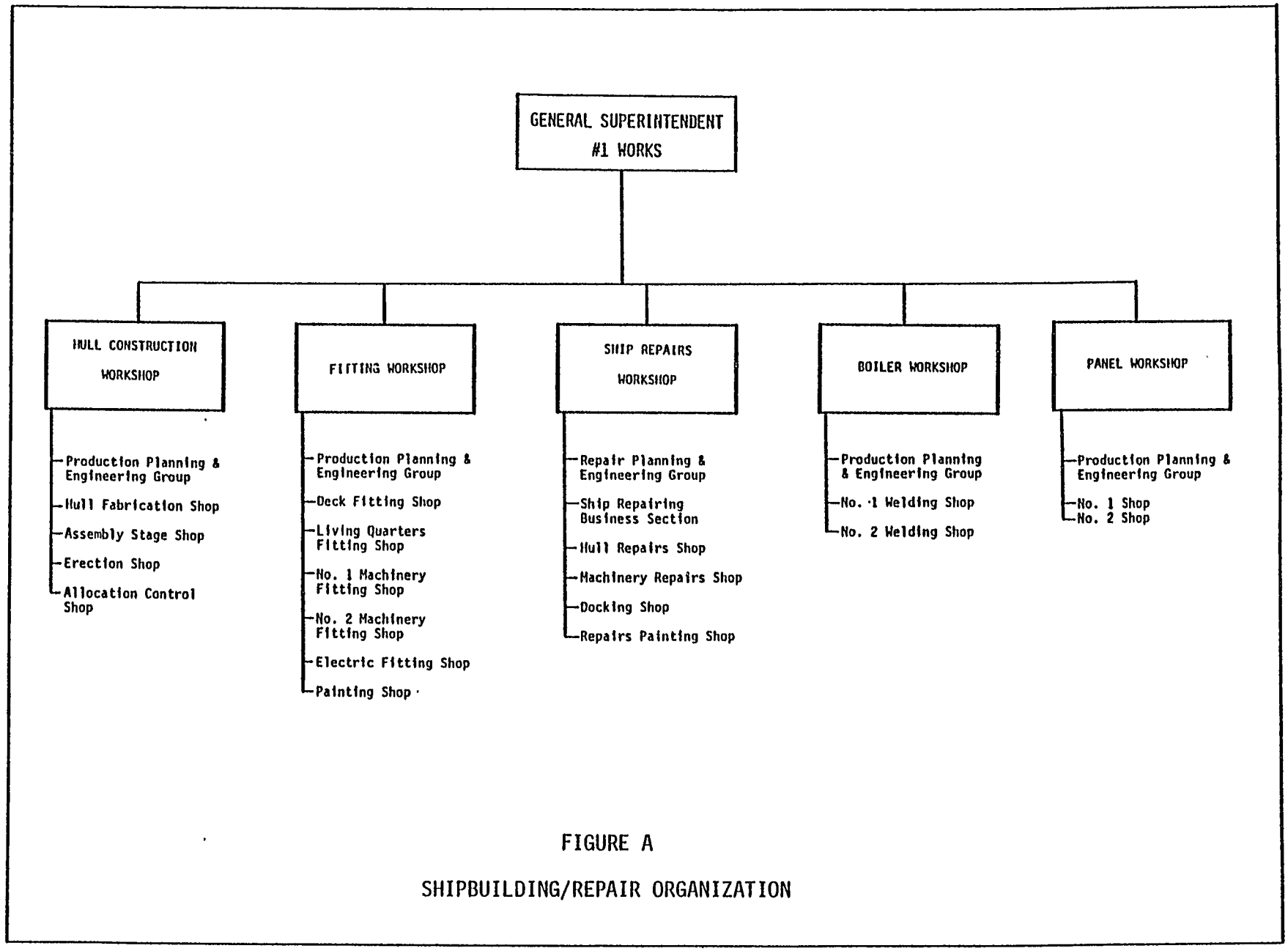


FIGURE A

SHIPBUILDING/REPAIR ORGANIZATION

15 and 18 years. This maturity and tenure of the workforce accounts for much of the stability of the IHI production system. The skill level of individual workers is extremely high as is their familiarity with the planning and production system.

Organization Analysis

The basic organization of an IHI shipyard (or the shipbuilding element of a district) is strictly oriented toward production (as opposed to marketing, administration, etc.) Because of the relationship of the yards to the IHI Head Office, the yards are relatively free from much of the general business activities concerned with the analysis and acquisition of new business, labor union activity, and administrative functions related to customer and government contacts and contracts. Although the yards do maintain some elements of each of the above functions, these are much reduced in scope and practice compared to a self-contained U.S. shipyard.

The heart of the production system within the IHI yards is formed by the several “Workshops”. Two of these workshops are dedicated to new ship construction: the Hull Construction Workshop and the Fitting Workshop. Two other workshops, the Ship Repair Workshop and the Boiler Workshop, accomplish production work for products other than new ship construction. A fifth, the Panel Workshop, serves Hull Construction and Ship Repair.

Supporting these workshops are the Ships Design Department, the Material Department, the Production Control Department, the Quality Control Department and various administrative and Industrial Relations departments or groups.

The workshops are organized into “sections” which logically follow the ship construction process, beginning with Production Planning and Engineering, and followed by Fabrication, Assembly and Erection. Outfitting activities generally follow the same process breakdown with fitting effort occurring at the various stages of sub-assembly, assembly and erection.

Although the term “group” is used throughout the organization to indicate different functions and numbers of people, the “work group” is generally used to describe the units of production workers concerned with the fabrication, assembly or erection process. These groups range in size from 5 to 10 workers. Each group is headed by an Assistant Foreman; is concerned with one particular part of the production process; remains in one location; and performs the same type of work on each component on which it works. One member of each group is assigned as a checker for all work processed by that group. Several groups report to a single Foreman who is in charge of a particular “work area” within a shop or assembly area.

Insofar as possible, work groups are structured with permanent personnel, locations, equipment and procedures. The group’s function is held as stable as possible throughout a production run of ships. Also, every effort is made to provide a continuous flow of work to each group in order to realize maximum productivity.

The Japanese are particularly “group’’-oriented. Individual achievement is not considered an acceptable goal in Japanese society. Rather, cooperativeness and successful group participation are the virtues most admired. Strong identification with the “work group”

and with the company for which one works is common to most Japanese workers, and the feeling of “family” is likely to be as pronounced in these relationships as with a person’s immediate family.

One of the most interesting aspects of the IHI shipyard organization is the placement of Staff Groups (Production Planning and Engineering Groups) in each of the production workshops and sections. These groups comprise a number of engineers who accomplish detailed planning, scheduling, trouble-shooting and coordination of the myriad activities in each workshop and section.

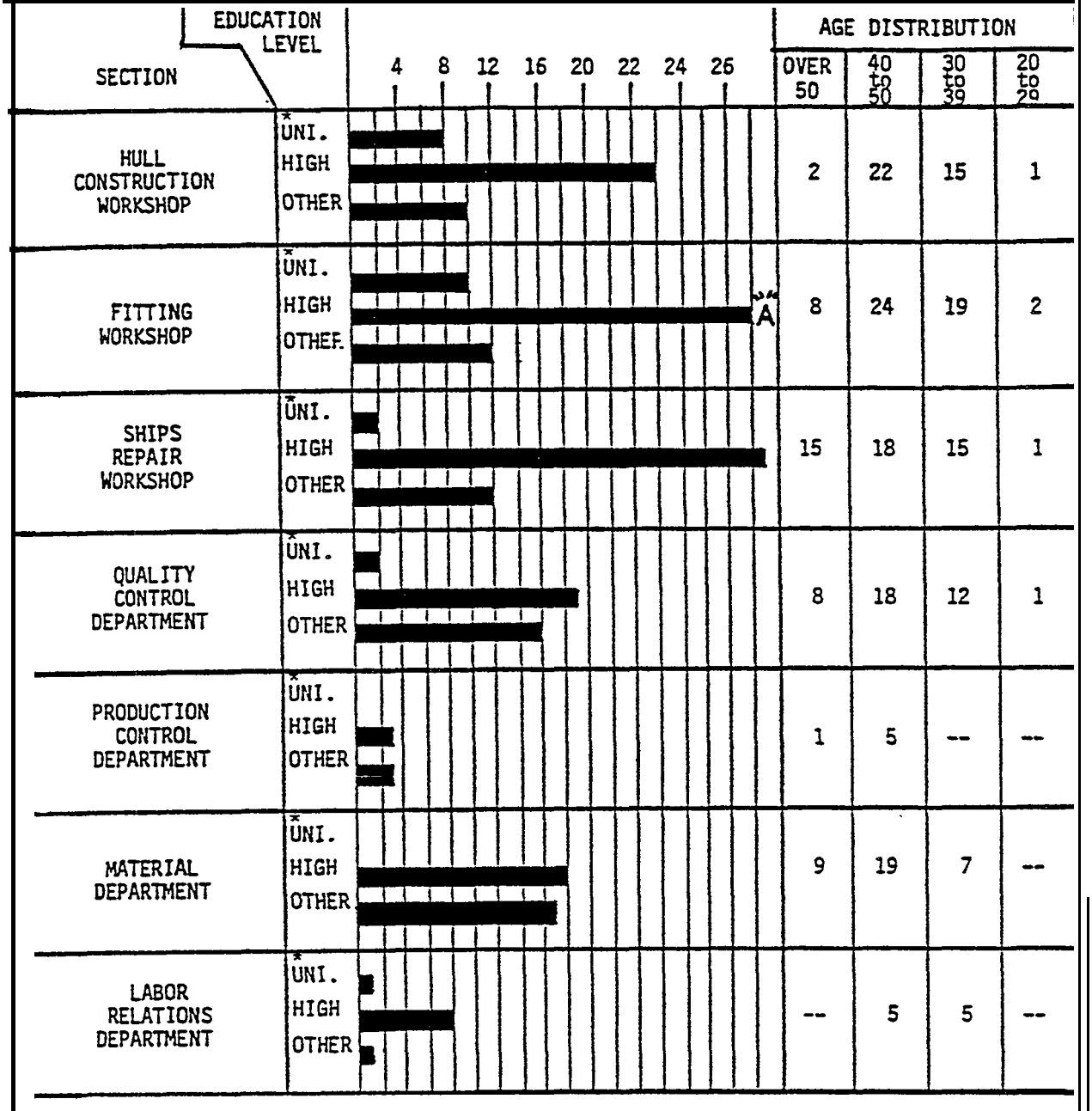
All Accuracy Control planning, workshop planning and sub-schedule development, lofting planning and scheduling, and data collection, analysis and feed-back are accomplished by these staff groups.

These groups work Laterally across the organization and interface with each other throughout the development of planning and scheduling data and in all aspects of material flow, processing and integration.

Figure B shows the distribution of staff personnel in the various departments of the IHI Aioi Shipyard. As shown in the figure, staff personnel are also used in Quality Control, Production Control, Material Control, and the Labor Relations Department. These personnel (with the exception of the Labor Relations Department) accomplish the planning and scheduling required to support the workshops in their respective areas. These people work closely with the workshop Staff Groups to coordinate all necessary aspects of production.

OPERATING PRACTICES

The IHI organization structure differs greatly from that of typical American firms primarily because it is more a description of



* UNI. - UNIVERSITY
HIGH - HIGH SCHOOL
OTHER - MIDDLE SCHOOL OR OTHER

"A" - 31 MEN

FIGURE B

DISTRIBUTION OF STAFF FOR EACH SECTION

AIOI SHIPYARD

functions than one of reporting responsibility. The American concept of delimiting authority and responsibility via the organization chart is not understood in IHI nor generally throughout Japan.

Because of the group orientation of all Japanese organizations, the individual tends to participate fully in every activity where his knowledge and expertise have application. The best example of this lateral activity is that of the workshop staff groups which control the detailed fabrication, sub-assembly, assembly and erection or fitting work related to their workshop down to the smallest level of detail. These staff engineers are required to work with every aspect of design and production and virtually nothing is beyond the purview of their responsibility.

The entire organization is extremely informal and flexible. With the exception of detailed working plans and schedules, almost all communication is oral and written memoranda; and procedures are almost totally absent.

Not only is the concept of organization different from typical American firms but so is the management philosophy inherent in the organization. The basic management objectives to implement the policies set forth by the Chief Executive of IHI concerning the production of quality products and the provision of a personnel and labor management system which benefits all employees of the company.

The emphasis on personnel welfare is the chief factor in the organization and operation of Japanese shipyards. The Japanese have instituted a system of “welfare capitalism” which works reciprocally for the employee and the company. This relationship is not simply

an economic arrangement between labor and management. Rather, it is based wholly on the concept that human dignity and welfare is the end objective of any system and that the corporation and the work performed therein is simply the means to achieve that objective.

The Lifetime Contract

When a person is hired into IHI shipyards it is with the understanding that the employment is for the working life of the employee. A “lifetime” contract is established (although not in written form) between the company and the employee which assures employment for the employee’s working career with IHI, beginning with the initial hiring and lasting until the age of retirement.

Under this arrangement the employee cannot be laid off or fired but may be relocated inside the corporation if work declines to a point where an individual company within the corporation cannot support its workforce.

This “lifetime” contract is an important aspect of the IHI personnel program and contributes substantially to the stability, tenure and productivity of the IHI workforce.

Communications

Communications in IHI yards are largely informal and by U.S. standards totally lacking in formal documentation. Typically the Japanese conduct the majority of their business “face-to-face” in either individual conversations or in meetings of the interested parties. The Japanese pride themselves on their ability to communicate informally and this is coupled with a distinct desire for consensus

decisions. The formal, written, factual and straight-forward memoranda and reports characteristic of American business are considered to be too harsh, too time-consuming, and too costly by the Japanese.

A significant aspect of this type of communication is that it encourages problem-solving in a direct manner without waiting for replies to memoranda or approvals of lengthy reports and plans. It also ensures that all personnel needing information and/or needing to participate in decisions are contacted, brought into the decision-making process and provided with ideas and recommendations from all participants. This process forces a decision and avoids the prolongation of problems which affect the production process. Additionally, this type of communication augments the "group" atmosphere of the shipyard, yielding an even greater sense of identity with, and participation in, the affairs of the company.

Productivity Improvement Programs

Several company-sponsored programs involve workers in continuing attempts to improve productivity in the IHI yards. In this regard conservation of both time and materials is considered a productivity improvement. Therefore, there is as much emphasis placed on the reduction of cost through conservation as for innovative production improvement ideas.

The three major improvement programs are the Suggestion/Award Program, the Zero Defects Program, and the Cost Reduction Program. Each of these programs receives a great deal of attention from both workers and management in the IHI yards. A friendly competition exists both within the yards between departments or work groups and also tween shipyards in different locations.

Employee Attitudes

Given the “Lifetime Contract”, together with the personnel benefits and welfare programs, the Japanese workman enjoys security, identity, participation, and meaningful and satisfying employment in a working career of his choice.

Such circumstances would lead an American industrial manager to question the individual productivity of workers who have all of these benefits. However, the Japanese are some of the most industrious workers in the world.

Japanese workmen work across trades in almost every shop and area of the shipyard. In both hull and fitting areas, many IHI workers are trained to do both welding and fitting work and every employee is trained in cutting, welding and crane signaling.

IHI welders in shop sub-assembly areas normally operate five gravity-feed welding machines simultaneously. Depending on a'man's ability he may operate as many as ten on some sub-assembly work. Personnel assigned to N/C cutting or flame planing machines will manually trim or cut small pieces from plate as the plate moves through the machine. Personnel operating bending machines may also be alternately accomplishing flame bending of the material, individually or in a group where each of the personnel are capable of doing both jobs. Personnel in the fitting shops regularly perform tasks that in a U.S. shipyard would require several different crafts.

This diligent effort is characteristic of the Japanese workman and has its roots in Japanese culture and ethics. The attitudes of the Japanese regarding proper behavior, personal responsibility and

integrity are manifest in their work habits, and in their respect for others in their work group and for the company for which they work. These attitudes are equally apparent throughout the management levels of the company and the IHI corporation. It is these attitudes which, perhaps more than any other single element, contribute to the stability and performance of the IHI shipyards.

EMPLOYEE PAY RATES

As of May 1979, Japan's Confederation of Shipbuilding and Engineering Unions Research Bureau published the following statistics on average pay rates for 204,800 shipyard employees:

1.) Average Age 35.8 Average Length of Service 13.7

2.) Average Basic Wage* (as of June 1978) - Monthly - $857.18
Hourly - $ 5.20

3.) Extra Pay for Overtime
(a) From 5:30 p.m. - 8:00 p.m. : 130% of hourly wage
(b) Before 9:00 a.m. and after 8:00 p.m., and weekends : 155 to 160% of hourly wage

(Based on 15 O/T hours per month average for large shipyards in 1977) $101.30 per month

4.) Bonus

(Based on average paid by the 7 largest shipyards in 1978) - $281.73 per month

5.) Welfare Benefits - $200.00 per month

6.) Monthly Summary

Basic Wage	O/T Pay	Bonus	Welfare Benefits	Total
$857.18	101.30	281.73	200	$1,440.21

7.) Hourly Summary

Basic Wage	O/T Pay	Bonus	Welfare Benefits	Total
$ 5.20	0.61	1.71	1.21	$8.73

*Based on an 8 hour day and an exchange rate of 200 yen per U.S. $.

In all Japanese shipyards, cost-of-living increases are negotiated twice a year in addition to regular annual increases.

In the area of management and supervision, which are not represented by the union, several classifications exist ranking the salaries from Class 1 (highest) to Class 6 (lowest). These salaries are determined by the District General Manager and reviewed at least once a year for correspondence with cost of living increases and new union settlements. Generally, management gets a rate of increase in salary and bonus commensurate with that obtained by the union.

A “Special Allowance” over and above the employee’s basic pay is added on special occasions, for example, when an employee is married or upon the birth of a child. The rationale for this is that the employee has added responsibility and, therefore, deserves added consideration from the-company. Special allowances are also provided upon the death of the employee, a member of his family and in the event of major injuries to him or his family.

BENEFITS

Vacations and Holidays

Vacation time for an IHI employee with from one to three years service is 14 days per year. From four to five years of service this time is raised to 17 days and from the sixth year until retirement 20 days vacation is standard. Vacation time can be carried over from year to year to a maximum of 40 days. No carry-over is allowed in excess of 40 days.

In addition to vacation time, each employee is given 18 paid holidays. Many of these are religious holidays occurring in the Spring and again in the Fall of each year. During these holidays the entire shipyard closes for a period of from one to two weeks.

Bonus Programs

In mid-summer each year the union negotiates with the shipbuilding industry to determine the annual bonus to be paid each employee. The union considers that the annual bonus is part of the basic remuneration paid to shipyard personnel and therefore strives to maintain and improve this compensation during these negotiations.

According to a union report* the bonus for each employee amounted to $3,380.77** for the year 1978. Bonus figures for 1979 were not available.

This annual bonus does not, however, reflect all of the bonuses paid by the company to individual employees. Many of the bonuses paid are congratulatory or consolatory and involve paid absences as well as direct cash contributions.

Congratulatory bonuses are paid to employees upon getting married and upon the birth of children. Approximately $175 is the bonus upon getting married, accompanied by five days off with pay,and $25 is paid upon the birth of each child,with five days off with pay. These bonuses are in addition to the pay adjustments which also accompany these events.

*Japan Confederation of Shipbuilding and Engineering Unions Research Bureau report dated May 1979.
**Based on a conversion rate of 200 yen per $.

Consolatory bonuses or solatiums) are paid to employees upon the death of a wife ($150 with seven days paid leave) or child ($75 with seven days paid leave).

Upon the death of an employee, the wife is given $1,000 to the company and, in a job-related death, the Japanese equivalent of Worker's Compensation will contribute $80,000 in a lump sum plus 50 percent of her spouse's average monthly earnings for the last three months is paid monthly for the remainder of her life.

Also, in the case of the death of an employee (on or off the job) a scholarship fund is established for each child of the deceased. For 'each child attending school who is over the age of 18, the amount paid is $75 per month. For those under 18 years of age the amount is $50 per month.

A retirement allowance (bonus) is paid to all employees who have achieved 30 years of service with the company and have attained the age of 55. Although 58 is the normal retirement age, workers who meet the above conditions are treated as retirees and paid the retirement allowance. Upon reaching the retirement age of 58, workers normally have the option of remaining with the company for an additional two years or retiring, depending on the state of their health. However, because of the cut-back in production in recent years most retirees have voluntarily retired upon reaching 58 or even earlier at age 55.

The retirement bonus is based on the education and position of the employee in the company at retirement. The lowest bonus paid would be to a technical worker who had graduated from a junior high

school and had spent 30 years as a worker. In this case (in 1978) the retirement bonus was approximately $42,000. In the case of an engineer with a university degree this bonus would be approximately $100,000. Upper management would get proportionately more.

Insurance

Health insurance programs are in operation in all IHI companies. This insurance typically covers hospitalization, out-patient expense and the expense of drugs and medications. These programs are not unlike those provided by American firms except that generally the benefits are more all-encompassing and the company pays the total premium.

Housing and Dormitories

When an employee is first hired and has to relocate his family to the shipyard site, temporary housing may be provided until he can locate a residence. Generally this temporary housing is provided by the company free-of-charge for a period of 30 days. However, in some cases, permanent housing may be provided within the confines of the shipyard for foremen, section managers and managers. In this case, a nominal rent is charged.

Many new employees are bachelors when they first go to work for the shipyards. Because of the low beginning pay offered these new employees,the company also offers dormitory quarters at a very low rate (approximately $4.00 per day).

When an employee marries and can no longer use dormitory facilities, the company offers low-interest loans to assist the employee in the purchase of a home.

Cafeterias and Commissaries

At all IHI shipyards a company cafeteria is operated for employees. Employees living on-site (in company housing or dormitories) can obtain al1 meals at these cafeterias. Personnel living off-site generally eat lunch at these facilities.

The cost of these cafeterias is shared by the company and the employees, in that the cost of the facility, of food preparation and of handling service is borne by the company, whereas the cost of the food itself is borne by the employees. This sharing of costs provides for low cost meals (approximately $0.60 for lunch) for all employees. A similar arrangement is provided for the management staff in separate facilities adjacent to their work areas.

At some yards small commissaries or co-ops are provided for employees. Usually these commissaries carry a modicum of foodstuffs and typical drug store items but may also carry small appliances and tools. Items sold in these commissaries or co-ops are usually priced well below those of retail merchants in the city.

Travel Allowances

The cost of commutation tickets (usually by train) is totally paid by the company for employees requiring such travel. Also, for employees who have to drive personal cars to work, travel allowances are paid according to the distance of travel required.

Work Clothing

All employees in the shipyard are issued uniforms, safety boots, gloves and safety helmets by the company. This clothing is replaced

by the company when it is sufficiently worn. Proper clothing is con-' sidered essential to the safety program and, therefore, has been standardized throughout the shipyards.

Commendation for Long Service

- Prizes (usually monetary) are awarded to employees who have served 20 years with the company. Successive awards are made every five years thereafter.

Upon reaching retirement age, employees and their wives are given a four-day trip by the company with all expenses paid.

PERSONNEL WELFARE PROGRAMS

In addition to the many employee benefit programs in IHI, several other on-going activities pertain to the safety and quality of life of the IHI workers. These established programs are augmented by management/union negotiations on personnel welfare occurring in the fall of each year.

Personnel welfare embraces all aspects of safety, environment, recreational facilities, medical/dental care, and employee relocation. These elements of employment are considered equal in importance to pay rates and benefits by the individual employees and their union.

Safety and Sanitation

Safety is of paramount importance in the shipyards of IHI. Intensive programs are continuously conducted to improve the safety aspects of ship construction.

Each yard maintains a full-time Safety Group which is in charge of the safety program and its implementation in the yard. The Safety

Group is divided into various sections: the Staff, which is responsi - ble for formulation of safety policy and instructions; a control comm- ittee for subcontractor safety requirements; and a safety inspection group which performs daily inspections of shipyard activities, corrects unsafe conditions and operating practices and reports back to the staff groups on inadequate safety measures.

This emphasis on safety has resulted in a very low incidence of job-related injury. For example, in Aioi a total of 9 lost-time injuries were reported in 1978, 5 in 1977, 11 in 1976, and 9 in 1975. The number of deaths in the yard since 1974 totals three. two of which were of subcontractor personnel.

Sanitation is also a major element of the Safety Program in the shipyards. This activity is concerned with all shipyard environmental conditions such as air and water pollution, noise, the working environment in shops, assembly and erection areas, and the environmental effects of the shipyard on the community. In these activities, stringent control of pollution (air, water, and noise) is accomplished and shipyard working conditions are constantly improved. Under the safety and sanitation programs, shop conditions have been improved by various types of ventilation systems, the enforced use of proper respiratory protection equipment, improved lighting, the removal of high noise equipment (e.g. chipping hammers) and through strict enforcement of open aisleways and transport lanes.

Abrasive blasting, acid cleaning, and primary painting operations are confined to enclosed buildings and the processes automated to the highest degree possible. In assembly and erection areas, sophisticated

scaffolding with safety rails and netting are used to provide easy and safe access to all parts of the large assemblies and of the ship. As part of each employee's uniform, a safety rope is worn attached to a web belt for use whenever working in high places. These and many other devices and procedures are an inherent part of the production process and the continuous safety and sanitation improvement programs constantly seeking new means for improving the working environment of the shipyard and for preserving the living environment of the community.

Environment

Separate from the safety and sanitation aspects of personnel welfare is the attempt to make each yard a pleasant working environment. This activity concerns the appearance and habitability of the shipyard and its desirability as a place to work.

The primary element of concern is cleanness of the facility and the orderly arrangement of all of the various shops, platen areas, storage areas, etc. This orderliness is supplemented by green areas (i.e. small areas of lawn, trees, various plants), fish ponds and smoking areas, wherever possible.

Another significant feature contributing to shipyard appearance is the use of pallets for the collection, storage and movement of materials. All small fabricated parts and outfitting materials are segregated on pallets of various types and sizes, as well as many loose working tools and equipment such as crane cables and alignment or attachment jigs. These pallets are usually stored in warehouses or immediately adjacent to the appropriate working area in designated locations. This use of pallets contributes greatly to facility

appearance and is an essential part of the material control process.

Control of scrap is another important aspect of facility cleanness. Scrap containers are situated in proximity to every operation and employees are charged with the responsibility for maintaining their work areas in a clean and safe condition at all times. Scrap is promptly removed after each cutting operation and slag from burning and welding operations is either collected in pre-positioned containers beneath work tables or automatically dumped by a slag-collecting plate conveyor in some locations.

Several practices are used by the IHI yards for periodic yard clean-up by employees. The IHI Kure shipyard stops work for 30 minutes at the end of each day to allow employees to thoroughly clean their work areas. In Aioi workers clean-up throughout the day at intervals where there is a break in the work flow or immediately after each operation which yields scrap or other residual material requiring clean-up.

Employee Facilities

Throughout the IHI shipyards, numerous facilities are provided for the employees ranging from housing to recreational areas. There is a determined effort to provide for the health and morale of the IHI workforce which embraces aspects of diet, exercise and convenience.

In addition to housing and cafeterias, recreational areas and facilities are provided by the company such as swinming pools, baseball diamonds, club houses, and the like. Also, many areas are designated in the yard (on streets) for employee activities during lunch time and after work. These areas are for use by the employees for

games such as tennis (without the net), volleyball, or any other team activity that can be accommodated in the prescribed area.

Medical/Dental Care

Each IHI shipyard has at least one full-time doctor and one full-time dentist on duty at all times. Medical care is provided for all workers as required, whether for job-related injuries or not. Provi - sion of medical and dental service in the yard naturally tends to decrease lost time due to employees having to seek outside medical/ dental attention. It is also a significant benefit for employees as the service is cost-free for the employees.

MANAGEMENT/LABOR RELATIONS

Japan has achieved what appears to be an almost ideal marriage of labor and management objectives which are mutually beneficial to both workers and the company.

Both management and workers point with pride to the fact that they are “partners”, in business to sustain and improve the shipbuild-ing industry, the particular enterprise, and the welfare of all em-ployees.

The underlying philosophy for this approach lies in the Japanese respect for human dignity and for the right of every individual to an acceptable livelihood and security. Seen from this viewpoint, the welfare of employees in all industries is the ultimate objective of business. This, of course, is regarded by most Americans as purest “socialism” and, in fact, Japan is far more socialistic in this prac-tice than the U.S. However, because of the respect for private

enterprise and for competition among the large industries, it is perhaps more welfare capitalism" than "socialism".

All employees (except managers, staff and engineering personnel) belong to the union, not because of any "closed shop" rules or attitudes, but because it is generally considered unfair (and consequently a "disgrace") to be covered by the union contract and"not belong"to and support the union. Because almost all employees belong to the one Shipbuilding Union which covers almost the whole shipbuilding industry, there is no fragmentation between yard workers. Unlike U.S. yards, where each craft is represented by a different union, Japanese workers identify with a single entity representing all crafts. This tends to consolidate the union memebers and alleviates much of the competition and disagreement between local unions. This situation also encourages unity rather than separatism within the crafts themselves. Japanese workers identify with and show allegiance to the shipbuilding industry, the shipbuilding union and to the company for which they work. This is in contrast to U.S. workers who identify first with their particular craft, the local craft union, the larger national union and then to the company.

The Japan Confederation of Shipbuilding and Engineering Workers Union (Japan ZOSEN JUKI ROREN) is the major shipbuilding industry union in Japan. This union represents the workers of all major shipbuilding companies and negotiates at the national level with the collective body of companies owning shipyards throughout the country.

The Shipbuilding Union is tied into the Japanese Confederation of Labor, which oversees all union movements in the country and attempts to uniformly develop each sector of union involvement in the society.

Each year three major negotiations are held by the union and the companies involved in shipbuilding. These negotiations are referred to as the yearly "struggles" and are programmed to accomplish definite objectives at each meeting. The Spring Struggle concerns wages and some fringe benefits; the Summer Struggle is primarily concerned with the establishment of the yearly bonus (which is considered by the Union to be a part of the basic wage of each worker); and the Fall Struggle is concerned with yearly labor agreements, improvement of working conditions, and personnel welfare programs. Cost of living increases are negotiated twice a year,in the Spring and again in the Summer. Many of these negotiations are conducted through a unified "struggle" of all union-organized industries. Many of the benefits discussed elsewhere in this report are. therefore universal throughout Japan.

On the local company level, union activities are largely carried out by the company's Labor Relations Department. This department is charged with the responsibility to administer the union contracts within the yard and to see that all requirements of the contract are satisfied by the company.

TRAINING

As in all other aspects of the shipyard, training in IHI is -highly systematized with thoroughly developed curricula and courses for new employees and for further education and refresher courses for those with longer tenure with the company.

Since the curtailment of hiring brought about by the shipbuilding recession in Japan, almost all apprentice programs have been suspended. However, continuing education of the workforce is considered

a vital part of the shipyard process and is inherent in every new shipbuilding program.

All new employees are thoroughly trained or indoctrinated into their jobs by means of several structured curricula. New employees are ranked according to the level of education completed and are required to take whichever training program parallels their formal education and the job for which they were hired.

All Middle School Graduates are initially trained in three basic functions upon entering IHI - welding, gas cutting and crane signaling. This training is accomplished within the first two to three weeks after hire. A thorough indoctrination in safety is also given all new employees.

Subsequent to the training in welding, burning and crane signaling the employee is assigned to a work group where “on-the-job” training begins. Because of the work group organization and the fact that work groups are relatively permanent and have a fixed location and routine, the integration of new employees is extremely smooth and does not adversely affect the productivity of any single group.

Additional training is provided on a formal basis for new employees depending on job skill requirements. The formal training program for these personnel is divided into either a two- or a four-year course.

As with the Middle School Graduates, High School Graduates are given two or three weeks of basic training in welding, burning and crane signaling. However, this training is a part of a four-month training course that is not nearly *as* extensive as that given Middle School Graduates.

All University Graduates are hired by the Head Office in Tokyo where they spend the initial two weeks of their employment. Upon assignment to a shipyard these employees spend two weeks in the yard training school followed by two months in one of the yard's production departments. Subsequent to this training the employee is assigned to the shipyard section mutually agreed upon by the employee and the company.

Personnel who do not fit the above categories are given a one-month course in the shipyard training school after which they are assigned to a yard section requiring unskilled or semi-skilled workers.

IHI considers that the entire workforce is constantly engaged in a program of continuing education and training which provides increasing opportunity for learning and promotion within the company. The majority of training occurs "on-the-job" through the gradual improvement in knowledge and skills provided by the interaction with one's work group and with the older and more experienced employees. The requirement for training subordinates exists at every level of the organization and this training is carried out assiduously by supervision and management personnel.

APPLICATION TO U.S. YARDS

The Japanese personnel-oriented system is one method for serving the best interests of both workers and management. Japanese concepts of private enterprise differ significantly from those of most U.S. firms in other respects also. In order to apply the "personnel-oriented" system of the Japanese, an American firm would have to re-align not only its way of doing business but also its philosophy with

regard to the objectives of the enterprise. Profit would have to be relegated to a position subordinate to the welfare of the people of the firm and to the quality of the product. This basic change in philosophy may preclude the successful adoption of the Japanese approach in the minds of many American businessmen. It should be realized, however, that Japanese corporations are nonetheless profitable and that their management practices, while radically different from those of U.S. corporations, may in fact be conductive to increased rather than reduced profits.

Aside from this basic philosophical difference, the principal obstacles to the application of the Japanese personnel system to U.S. shipyards are the attitudes extant between management and labor (unions), and the employee attitudes prevalent in U.S. industry, both of managers and workers. These attitudes can be vastly ameliorated by the introduction of many of the elements characteristic of the Japanese personnel system: full implementation of the Japanese system is however, impossible under the prevailing labor movement precepts in the U.S. In this regard, an attitude of mutual objectives and cooperation, similar to that of the Japanese, would have to develop between American labor and management both of individual firms and eventually of the whole industry.

Irrespective of labor/management attitudes, several aspects of the Japanese personnel system can be instituted in U.S. yards. For example: the IHI production organization or pieces of that organization is amenable to adaptation to a U.S. yard. Those organizational elements having to do with the production workshops, especially the

use of “Staff” groups and the organization into production stages of fabrication, sub-assembly, assembly and erection, are readily adaptable to any shipyard. This would, of course, require a reorganization and reorientation of the traditional U.S. concepts of Production Planning and Control activities and, if not carefully controlled, could cause some disruption of work in process. If this reorganization was attempted, the Japanese system of planning, scheduling and production control would necessarily have to be at least partially instituted.

In the area of Benefits, U.S. firms can initiate some activity aimed at increasing the concern of the company for the employees and, hopefully, improving the image of the company in the eyes of its employees. The reciprocal of this activity would be improved labor/management relations, more identity with and allegiance to the company, and possibly a more stable workforce because of this allegiance. Improved productivity would be a natural and a necessary by-product of these positive attitudes.

Some of the benefits most amenable to adaptation are: Bonus Programs (i.e. congratulatory/consolatory/retirement or possibly incentive-type); longevity pay scales; improved eating facilities; and provision of work clothing.

Extending these benefits into the area identified by the Japanese as Personnel Welfare Programs, U.S. yards can adopt some of the more intensive safety and sanitation methods; an extensive environment program to improve general yard working conditions; provision of employee recreational facilities; improved in-yard medical and dental care; housing programs; and other similar programs obviously oriented

toward the welfare of the employees.

Finally, the institution of a system whereby workers can be allocated to a fixed work station and work group is an important and achievable aspect of the Japanese personnel system that can be adapted to U.S. yards. This is a difficult and far-reaching undertaking for a yard not already organized by work station (for performance of certain types of work, albeit by different personnel). The many benefits deriving from the assignment of permanent work groups to a single location concern employee identity, skills improvement, use of routine or "mass production" techniques, accurate individual and group performance measurement, and the eventual development of firm estimating, cost control, and scheduling parameters. The institution of this "work group" system would require considerable change to traditional centralized planning and control system, to the production/facility utilization system, and to the manpower allocation system utilized by most yards.

Overall, the adaptation of any of the above personnel-oriented systems or practices should enhance U.S. shipyard performance. The institution of any single aspect of the Japanese personnel system should yield positive results in terms of personnel satisfaction with the company and identity with the company, and should therefore enhance the productivity of the workforce as a whole.

Every feature of the Japanese shipbuilding industry's approach to industrial relations has its return in improved productivity. Many of these features have direct applicability in U.S. shipyards. Given a positive and cooperative attitude on the part of both shipyard

managements and shipbuilding unions, there is every reason why many of these features should be adopted in U.S. shipyards, to the mutual benefit of stockholders and employees.